



STATE OF CONNECTICUT
DEPARTMENT OF
ENVIRONMENTAL PROTECTION
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Water Quality Standards



Surface Water Quality Standards Effective April 8, 1997
Ground Water Quality Standards Effective April 12, 1996

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PREFACE

The Water Quality Standards and Criteria (WQS) set forth in this publication are an important element in Connecticut's clean water program. The WQS set an overall policy for management of water quality in accordance with the directive of Section 22a-426 of the General Statutes. In simple terms the policies can be summarized by saying that the Department of Environmental Protection shall:

- Protect surface and ground waters of high quality from degradation.
- Segregate waters used for drinking from those that play a role in waste assimilation.
- Restore surface waters that have been used for waste assimilation to conditions suitable for fishing and swimming.
- Restore degraded ground water to protect existing and designated uses.
- Provide a framework for establishing priorities for pollution abatement and State funding for clean up.
- Adopt standards that promote the State's economy in harmony with the environment.

There are three elements that make up the WQS. The first of these are the Standards themselves. This is the text of the policy statements (pages 5 through 10) which discuss issues such as classification of different water resources according to the desirable use, anti-degradation, allowable types of discharges, the fundamental principles of waste assimilation, and a variety of other subjects. The second element, also contained in this document, are the Criteria (pages 10 through 21). These are descriptive and numerical standards that describe the allowable parameters and goals for the various water quality classifications. The final elements are the WQS and Classification Maps which show the classification assigned to each surface and groundwater resource throughout the State. These maps also show the goals for the water resources, and in that manner provide a blueprint and set of priorities for our efforts to restore water quality.

These three elements comprise the WQS and are adopted using the public participation procedures contained in Section 22a-426 of the General Statutes. The Standards, Criteria and Maps are reviewed and revised roughly every three years. Any change is considered a revision requiring public participation. The public participation process consists of public meetings held at various locations around the State, notification of all chief elected officials, notice in the Connecticut Law Journal and a public hearing. The Classification Maps are the subject of separate public hearings which are held for the adoption of the map covering each major drainage basin in the State.

As with any complex program, it is always difficult to anticipate the questions that the public may have about either proposed or adopted standards. The staff of the Planning and Standards Division of the Bureau of Water Management are the best source of information about these WQS and are always willing to provide answers to your questions. They may be contacted by writing to:

Assistant Director
Planning and Standards Division
Bureau of Water Management
Department of Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127

The WQS do not stand alone; rather, they are one critical element in our program to protect and improve water quality. The WQS are written in response to, and in concert with, the principles of Connecticut's Clean Water Act, which is in Chapter 446k of the General Statutes. The Statutes set the broad outline and legal framework for our entire program. They establish the authorities and procedures for the WQS, for permitting discharges to the waters of the State and for the abatement of pollution. Within the framework of the Statutes, the WQS establish broad policy and objectives to meet the statutory goals. These objectives are then carried out by means of specific procedures and requirements of

statutory sections and even more detailed regulations. These include Statutes and Regulations for the permitting of discharges to the waters of the State, hazardous materials management, solid waste management, water diversions, structures, dredging, wetlands and others.

As an example of how these pieces fit together the following may be of assistance.

- Section 22a-430 of the General Statutes allows and sets procedures for the permitting of discharges of treated wastewater to the waters of the State.
- The WQS set forth the types of treated wastewater discharges that can be allowed in various water quality classifications in order to meet the statutory goals. In addition, the WQS provide the principles of waste assimilation and the goals for the receiving waters.
- If the type of discharge is allowed, then the details of application procedures and requirements for treatment, monitoring and reporting of the specific discharge are provided by Sections 22a-430-1 through 4 of the Regulations of Connecticut State Agencies.

The WQS provide policy guidance in many different areas, all of which are subject to detailed statutory and regulatory requirements. Some examples are as follows:

- Decisions on the acceptability of a type of discharge to a specific water resource.
- Any decision on the siting of a landfill.
- Decisions on the type of remediation and priority for the cleanup of hazardous waste sites.
- Decisions on the priority assigned to improvements of municipal sewerage systems and the priority for funding such projects.
- Decisions on Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act, which are required for any federally permitted activity which results in a point or nonpoint source discharge to a surface water resource.

If you have further questions about the Water Quality Standards please do not hesitate to contact the staff.

I. INTRODUCTION

Section 22a-426 of the General Statutes requires that the Commissioner of Environmental Protection adopt standards of water quality for all the State's waters. The purpose of these standards is to provide clear and objective statements for existing and projected water quality and the general program to improve Connecticut's water resources. They also serve to qualify the state and its municipalities for available federal grants for water pollution control.

Section 22a-426 mandates these standards shall:

- (1) Apply to interstate waters or portions thereof within the State.
- (2) Apply to such other waters within the State as the Commissioner may determine is necessary.
- (3) Protect the public health and welfare and promote the economic development of the State.
- (4) Preserve and enhance the quality of State waters for present and prospective future use for public water supplies, propagation of fish and aquatic life and wildlife, recreational purposes and agricultural, industrial and other legitimate uses.

- (5) Be consistent with the health standards as established by the Department of Public Health Services.

Water Quality Classifications, based on the adopted Water Quality Standards (WQS), establish designated uses for surface and ground waters and identify the criteria necessary to support those uses. The designated use and criteria goals serve to focus the department's water quality management activities, including establishment of water quality based treatment controls and strategies required by the Federal Clean Water Act.

Section 303 of the Federal Clean Water Act requires state adoption of surface WQS and their review and modification at least once every three years. Federal law defines WQS as the identification of water quality goals of a water resource through the assignment of designated uses to be made of the water and by setting criteria necessary to protect the uses.

Federal regulations specify that WQS should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water, taking into consideration their use and value for public water supplies, propagation of fish, shellfish and wildlife, recreation in and on the water and agricultural, industrial and other purposes including navigation.

Although federal law requires adoption of WQS for surface waters, WQS for ground waters are not subject to federal review and approval. Connecticut's WQS recognize that surface and ground waters are interrelated and address the issue of competing use of ground waters for drinking and for waste water assimilation. These standards specifically identify ground water quality goals, designated uses and those measures necessary for protection of public and private drinking water supplies; the principal use of Connecticut's ground waters.

II. SURFACE WATERS STANDARDS

1. It is the State's goal to restore or maintain all surface water resources, including wetlands, to a quality consistent with their existing and designated uses and supportive criteria.
2. Existing water uses and the level of water quality necessary to protect the existing and designated uses shall be maintained and protected.
3. Surface waters with a classification goal of B or SB and with an existing quality better than established standards shall be maintained at their existing high quality, unless the Commissioner finds, after adequate opportunity for intergovernmental review and public participation, that allowing lower water quality is necessary to accommodate overriding statewide economic or social development, and that existing and designated uses will be fully protected. The implementation procedures for the anti-degradation provisions of the State Water Quality Standards are provided in full in Appendix A.
4. For new or expanded discharges to high quality waters, the Commissioner shall, at a minimum, require of discharge permit applicants a level of treatment meeting the highest applicable standards of performance promulgated pursuant to the Federal Clean Water Act as well as Sections 22a-426, 22a-430 and 22a-436 of the General Statutes, and require additional treatment measures deemed necessary to prevent pollution and maintain high water quality. The Commissioner shall also require the use of appropriate Best Management Practices for control of point and nonpoint source discharges to high quality waters.
5. Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and forests and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. The lowering of water quality is prohibited for such waters except where limited activities will result in only temporary and insignificant changes in water quality.
6. Standard (1) shall be met except where a Use Attainability Analysis demonstrates that the water resource has been irreparably altered to the extent certain designated uses have been permanently lost. The determination of where these exceptions exist, including identification of the specific uses which have been permanently lost and designation of quality criteria necessary to protect all other existing, designated and potential future uses

of the water resource, shall be made by the Commissioner as a revision to the Water Quality Standards in accordance with Section 22a-426 and shall be subject to the approval of the Federal Environmental Protection Agency.

7. Any person or municipality requesting a change in Water Quality Classification shall demonstrate to the Commissioner that the proposed new Class designation is consistent with all existing or designated uses made of, or presently possible in, such waters. Any such change in a water quality classification shall be considered a revision of the Water Quality Standards and subject to the public participation requirements of Section 22a-426 of the General Statutes. With regard to any such change in Water Quality Classification the provisions of Standards (3) and (4) of this Standard shall be met.
8. Water quality criteria do not apply to conditions brought about by natural causes. Natural hydrologic and geologic conditions may cause excursions from established criteria. The meaning of the word 'natural' is not limited to only those conditions which would exist in water draining from pristine land. Conditions which exist in the water, in part due to normal uses of the land, may be considered natural. It shall not be considered normal use of the land if excursions from established criteria result in the loss of an existing or designated use.
9. Discharges to surface waters shall be limited as follows:
 - (A) Class AA, A and SA surface waters: discharges may be permitted by the Commissioner from public or private drinking water treatment systems, dredging and dredge material dewatering operations and other clean water discharges. In Class AA surface waters such discharges shall be subject to the approval of the Commissioner of Health Services. The Commissioner may authorize other discharges to waters with a water quality goal of SA, A or AA provided the Commissioner finds such discharge will be of short duration and is necessary to remediate surface water or ground water pollution. Any such discharge must be treated or controlled to a level which in the judgement of the Commissioner, protects aquatic life and public health.
 - (B) Class B and SB surface waters: discharges may be permitted for all those allowed in Class AA, A and SA waters, cooling water discharges, discharges from municipal and industrial wastewater treatment systems and other discharges subject to the provisions of Section 22a-430.
 - (C) The designation of surface waters as Class C/B, D/B, SC/SB or SD/SB shall not be a reason for authorizing a new discharge that would not allow the receiving surface waters to attain Class B or Class SB designated uses and quality criteria.
 - (D) The designation of surface waters as Class B/AA, B/A, C/A, SB/SA, or SC/SA shall not be a reason for authorizing a new discharge that would be inconsistent with Class AA, A or SA water quality goals.
10. The Commissioner may, on a case-by-case basis, establish zones of influence when permitting discharges to surface waters to allocate a portion of the receiving water resource for mixing and assimilation of a discharge effluent. Unless otherwise indicated in these Standards, the water quality criteria for a given class apply outside a zone of influence for a discharge permitted pursuant to Section 22a-430 of the General Statutes. The zone of influence shall not preclude attainment of any existing or designated uses of the receiving water resource. The spatial dimensions and/or volume of receiving water allocated to zones of influence will be established based on the unique physical, chemical and biological characteristics of the receiving waterbody. The Commissioner may require Permit applicants to provide information on receiving water and waste water characteristics including the volume of flow and spatial dimensions required for mixing and assimilation of waste. Considerations to be used in establishing zones of influence include, but are not limited to:
 - (A) Characteristics of the discharge, such as the volume, strength and persistence of any substances in the discharge effluent, potential bioaccumulation or bioconcentration of these substances in aquatic

organisms, the temperature of the discharge and the potential for any substances, either singly or in combination with other substances present in the effluent or receiving waterbody, to result in an unacceptable risk to human health or the environment.

- (B) Allowance for a continuous zone of passage for free swimming and drifting organisms.
- (C) Impingement upon spawning grounds or nursery areas of sensitive aquatic organisms or areas utilized by aquatic organisms for shelter and living space to the extent that the environmental value of the receiving waterbody is significantly reduced.
- (D) The location of other discharges to the receiving waterbody to insure that the cumulative effect of adjacent zones of influence will not significantly reduce the environmental value or preclude any existing or designated uses of the receiving waterbody.

Assessment of environmental value will be based on a number of receiving water characteristics, including but not limited to: type of waterbody, velocity, depth, number and type of aquatic habitats, migration patterns, nature of the food chain, level of productivity, water temperature, ability of tributaries to provide recruitment, presence of endangered species and value to human uses (aesthetic, commercial and sport fishing and recreational uses). As a guideline, zones of influence for assimilation of thermal discharges shall be limited to no more than 25% of the cross-sectional area or volume of flow.

11. The minimum average daily flow for seven consecutive days that can be expected to occur once in ten years under natural conditions (7Q10) is the minimum flow to which the standard for surface waters apply, except when a stream has been historically regulated to result in low flows below that level, in which case the standards apply to that low flow determined by the Department of Environmental Protection's Minimum Flow Regulations as amended (Connecticut General Statutes Section 26-141a); the Department's Diversion Permit Program (Section 22a-365 through 22a-378); or the Federal Energy Regulatory Commission's hydropower licensing process (Federal Power Act 18 USC SEC 791). Maintaining a long-term flow of 7Q10 or less may result in significant stress on the physical and biological quality of surface waters. In those surface waters having regulated flows at, near or below the naturally occurring 7Q10 flow, more stringent water quality criteria may be required to achieve and maintain existing and designated uses. The Commissioner may approve limitations based on minimum average daily flow in excess of 7Q10 conditions, provided the Commissioner is satisfied that special measures will be implemented during low flow conditions which provide protection to the environment at least as effective as that protection which would pertain if limitations were based on 7Q10 conditions alone.

Water resources which are influenced by tidal forces or which experience short-term variation in flow due to periodic or irregular water release from upstream diversions or other causes may require special consideration with regard to protecting existing and designated uses, including consideration of the minimum flow to which Standards apply.

12. The Commissioner, pursuant to Chapter 446k of the Connecticut General Statutes and regulations adopted thereunder, will regulate discharges to the waters of the State to assure that such discharges do not cause pollution due to acute or chronic toxicity to aquatic and marine life, impair the biological integrity of aquatic or marine ecosystems or result in an unacceptable risk to human health.
- (A) In making a determination under Chapter 446k of the Connecticut General Statutes as to whether a discharge or other activity will or can reasonably be expected to cause pollution of the waters of the State, the Commissioner shall consider the numeric criteria for the toxic pollutants listed in Appendix D.
 - (B) The Commissioner may amend the numeric criteria for the toxic pollutants listed in Appendix D of these Water Quality Standards in accordance with the procedures specified in Section 22a-426 of the

Connecticut General Statutes on his or her own initiative, or upon request of any person or municipality that site-specific criteria be adopted, provided such request is supported by sound scientific and technical evidence demonstrating the following:

1. Local conditions at the site differ significantly from those used in establishing the statewide criteria.
 2. The site-specific criteria will be sufficiently stringent to protect all existing and designated uses of the waterbody.
 3. The site-specific criteria were derived consistent with sound scientific and technical principles, giving consideration to all applicable federal guidance.
13. Surface waters and sediments shall be free from chemical constituents in concentrations or combinations which will or can reasonably be expected to result in acute or chronic toxicity to aquatic organisms or impair the biological integrity of aquatic or marine ecosystems outside of any allocated zone of influence or which will or can reasonably be expected to bioconcentrate or bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels which will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic life. In determining consistency with this Standard, the Commissioner shall at a minimum consider the specific numeric criteria listed in Appendix D and any other information he or she deems relevant.
 14. Benthic invertebrate criteria may be utilized where appropriate for assessment of the biological integrity of surface waters. The criteria apply to the fauna of erosional or riffle habitats in flowing waters which are not subject to tidal influences.
 15. The discharge of radioactive materials in concentrations or combinations which would be harmful to human, animal or aquatic life shall not be allowed. The applicable criteria can be found in Title 10 Part 20 of the Code of Federal Regulations.
 16. Reasonable controls or Best Management Practices for control of nonpoint source pollutants may be required by the Commissioner on a case-by-case basis.
 17. Controls on point and nonpoint sources of phosphorus and nitrogen which contribute to the eutrophication of any surface water including streams, rivers, lakes, ponds, impoundments and Long Island Sound may be required on a case-by-case basis.
 18. Use of Best Management Practices and other reasonable controls of nonpoint sources of nutrients and sediment is preferable to the use of biocides for correction of eutrophic conditions.
 19. Potential drinking water supplies identified in the Long Range Plan for Management of Water Resources prepared and adopted pursuant to Section 22a-352 or in an individual water supply plan approved in accordance with Section 22a-32d of the Connecticut General Statutes shall be designated as Class AA surface waters.
 20. Section 22a-417 of the Connecticut General Statutes imposes an absolute restriction on the discharge of sewage to Class AA reservoirs and their tributaries. A discharge outside the State shall not be a valid reason for either relaxing the restriction in Connecticut or changing the Class AA designation. It is a State policy to pursue the adoption of compatible Water Quality Standards in neighboring states to assure the protection of Connecticut drinking water supplies.
 21. Disinfection shall be required for all treated domestic sewage discharges to surface waters. The period of disinfection shall vary depending on the nature of the receiving waterbody as described below:

1. Continuous disinfection shall be required at all domestic sewage treatment plants located south of Interstate Highway 95 (I-95) to protect the sanitary quality of shellfish resources.
2. Disinfection shall be required during the period from May 1 to October 1 at all domestic sewage treatment plants located north of I-95. Seasonal disinfection is intended to protect the sanitary quality of bathing waters and minimize adverse impacts to aquatic life associated with disinfection. An alternative schedule, including continuous disinfection, may be required if found necessary by the Commissioner to protect existing and designated uses.

It is recognized that criteria for indicator bacteria may not be met during periods when disinfection of sewage treatment plant effluent is not required.

22. The discharge of sewage, sink and galley wastes from boats, whether or not treated by any marine sanitation device, is prohibited in all inland freshwaters not capable of interstate navigation and in marine waters identified in accordance with Regulations developed through the authority of Public Act 90-173.
23. Indicator bacteria are used to detect the presence of contamination by human or animal wastes. Due to the inherent uncertainty involved in sampling and analytical determination of bacteria levels, excursions from established ambient criteria should be investigated by means of a field survey of sanitary conditions or other appropriate means to determine sanitary quality (see also Appendix B).
24. Physical obstructions such as dams, which prevent fish reaching an area suitable for spawning and growth, shall not be considered a valid reason for not achieving and maintaining water quality conditions necessary to support all existing and designated uses for a waterbody unless the Commissioner has approved a Use Attainability Analysis in accordance with all applicable State and Federal statutes and regulations, consistent with the Department's anti-degradation policy.
25. In the estuarine segments (Class SB) of the Housatonic, Connecticut and Thames Rivers, the allowable temperature increase from discharges shall be consistent with the criteria for the non-tidal segments (Class B).
26. Except within designated dredged material disposal areas or areas approved by the Commissioner for placement of fill under the authority of Section 22a-32, surface waters and sediments shall be substantially free of pollutants that: a) unduly affect the composition of bottom fauna; b) unduly affect the physical or chemical nature of the bottom; or c) interfere with the propagation and habitats of shellfish, finfish and wildlife. Dredged materials dumped at approved disposal areas shall not pollute the waters of the state and shall not result in: a) floating residues of any sort; b) release of any substance which may result in long-term or permanent degradation of water quality in waters overlying or adjacent to the disposal areas; c) dispersal of sediments outside a zone of influence enclosing the designated disposal points; or d) biological mobilization and subsequent transport of toxic substances to food chains.
27. Surface water quality monitoring methods shall conform to the Department of Environmental Protection, Water Management Bureau's Quality Assurance Project Plan, consistent with 40 CFR Part 30. Other different but equivalent or better methods may be utilized if they have received the Commissioner's prior approval.
28. As part of the Commissioner's continuing efforts to further define WQS, other criteria will be considered. The Commissioner reserves the right to amend or extend the criteria for each Class of waters as new information or improved or more stringent criteria relative to water quality impacts are developed and justified subject to the legal and procedural requirements of State and Federal laws or regulations.
29. Surface waters, including wetlands which are not otherwise designated, shall be considered as Class A or Class SA.

30. Watercourses which are fully enclosed in drainage conduits or pipes and not assigned a specific Class may be considered, on a case-by-case basis, to be the Class of the stream segment to which they discharge.
31. Where existing water quality does not meet the designated use and quality criteria goals, the existing quality will be identified, followed by the use goal (e.g., C/B).
32. Revisions to the WQS, including but not limited to the following, shall be subject to the public participation process provided for in Section 22a-426 of the General Statutes:
 - (A) The adoption of a map which depicts the Water Quality Goals and Classifications assigned to any water resource.
 - (B) Any decisions regarding the lowering of water quality in existing high quality Class B or SB waters or a change in the Water Quality Classification of any water resource.
 - (C) The adoption of any Use Attainability Analysis.
33. The surface WQS shall apply to all tidal waters, harbors, estuaries, rivers, brooks, watercourses, waterways, lakes, ponds, marshes, bogs, those portions of inland wetlands which are inundated or saturated by surface or ground waters at a frequency and duration sufficient to support, and that under normal circumstances do support, prevalence of vegetation typically adapted for life in saturated soil conditions and those portions of tidal wetlands below mean high water.

III. SURFACE WATER CLASSIFICATIONS

INLAND SURFACE WATERS

CLASS AA

Designated Use - Existing or proposed drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other purposes, (recreational uses may be restricted).

CRITERIA

<u>Parameter</u>	<u>Standard</u>
1. Aesthetics	Uniformly excellent
2. Dissolved oxygen	Not less than 5 mg/l at any time.
3. Sludge deposits-solid refuse-floating solids-oils and grease-scum	None other than of natural origin.
4. Color	None other than of natural origin.
5. Suspended and settleable solids	None in concentrations or combinations which would impair the most sensitive designated use; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of the bottom; none which would adversely impact aquatic organisms living in or on the bottom substrate.

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| 6. | Silt or sand deposits | None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity or dredging provided all reasonable controls or Best Management Practices are used. |
| 7. | Turbidity | Shall not exceed 5 NTU over ambient levels. All reasonable controls or Best Management Practices are to be used. |
| 8. | Indicator bacteria | Total coliform organisms (MF) shall not exceed a monthly moving arithmetic mean of 100/100 ml for the most recent 12 months. No individual sample shall exceed 500/100 ml. Refer to Standard number 23 and Appendix B. |
| 9. | Taste and odor | None other than of natural origin. |
| 10. | pH | As naturally occurs. |
| 11. | Allowable temperature increase | None other than of natural origin except when it can be demonstrated that fish spawning and growth will not be impaired, in which case Class B Standards and Criteria apply. |
| 12. | Chemical constituents | None in concentrations or combinations which would be harmful to the most sensitive designated water use. Refer to Standards numbers 10, 11, 12, 13, and 17. |
| | (a) Phosphorus | None other than of natural origin |
| | (b) Sodium | Not to exceed 20 mg/l |
| 13. | Benthic Invertebrates which inhabit lotic waters | A wide variety of macroinvertebrate taxa should normally be present and all functional feeding groups should normally be well represented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irreversible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles) and Trichoptera (caddisflies) should be well represented. |

CLASSIFICATIONS

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|------------------------------|---|
| - <u>AA</u> | Known or presumed to meet Water Quality Criteria which support the designated uses. |
| - <u>B/AA</u> or <u>C/AA</u> | May not be meeting Class AA Water Quality Criteria or designated uses. The water quality goal is achievement of Class AA Criteria and attainment of Class AA designated uses. |

INLAND SURFACE WATERS

CLASS A

- | | |
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| Designated Uses - | Potential drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other legitimate uses, including navigation. |
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CRITERIA

<u>Parameter</u>	<u>Standard</u>
1. Aesthetics	Uniformly excellent
2. Dissolved oxygen	Not less than 5 mg/l at any time.
3. Sludge deposits-solid refuse - floating solids -oils and grease-scum.	None other than of natural origin.
4. Color	None other than of natural origin
5. Suspended and settleable solids	None in concentrations or combinations which would impair the most sensitive designated use; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of the bottom; none which would adversely impact aquatic organisms living in or on the bottom substrate.
6. Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity or dredging provided all reasonable controls or Best Management Practices are used.
7. Turbidity	Shall not exceed 5 NTU over ambient levels. All reasonable controls or Best Management Practices to be used.
8. Indicator Bacteria	Total coliform organisms (MF) shall not exceed a monthly moving arithmetic mean of 100/100 ml for the most recent 12 months. No individual sample shall exceed 500/100 ml. For established bathing waters, enterococcal organisms shall not exceed a geometric mean of 33/100 ml and no sample shall exceed 61/100 ml. Refer to Standard number 23 and Appendix B.
9. Taste and odor	None other than of natural origin.
10. pH	As naturally occurs.
11. Allowable temperature increase	None other than of natural origin except when it can be demonstrated that fish spawning and growth will not be impaired, in which case Class B Standards and Criteria apply.
12. Chemical constituents	None in concentrations or combinations which would be harmful to the most sensitive designated water use. Refer to Standards numbers 10, 11, 12, 13 and 17.
(a) Phosphorus	None other than of natural origin.
13. Benthic Invertebrates which inhabit lotic waters.	A wide variety of macroinvertebrate taxa should normally be present and all functional feeding groups should normally be well represented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irreversible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles) and Trichoptera (caddisflies) should be well represented.

CLASSIFICATIONS

- **A** Known or presumed to meet Water Quality Criteria which support designated uses.
- **B/A** or **C/A** May not be meeting Water Quality Criteria or one or more designated uses. The water quality goal is achievement of class A Criteria and attainment of Class A designated uses.

INLAND SURFACE WATERS

CLASS B

Designated Use - Recreational use; fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation.

CRITERIA

<u>Parameter</u>	<u>Standard</u>
1. Aesthetics	Good to excellent
2. Dissolved oxygen	Not less than 5 mg/l at any time.
3. Sludge deposits - solid refuse - floating solids - oil and grease - scum	None except for small amounts that may result from the discharge from a waste treatment facility providing appropriate treatment.
4. Color	None which causes visible discoloration of the receiving stream outside of any designated zone of influence.
5. Suspended and settleable solids	None in concentrations or combinations which would impair the most sensitive designated use; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of the bottom; and none which would adversely impact aquatic organisms living in or on the bottom sediments; shall not exceed 10 mg/l over ambient concentrations.
6. Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity or dredging activity provided all reasonable controls or Best Management Practices are used.
7. Turbidity	Shall not exceed 5 NTU over ambient levels. All reasonable controls and Best Management Practices to be used.
8. Indicator bacteria	As an indicator of general sanitary quality Fecal coliform shall not exceed a geometric mean of 200 organisms/100 ml in any group of samples nor shall 10% of the samples exceed 400 organisms/100 ml. For established bathing waters, enterococcal organisms shall not exceed a geometric mean of 33 organisms/100 ml, and no single sample shall exceed 61/100 ml. Refer to Standard number 23 and Appendix B.
9. Taste and odor	None that would impair any usages specifically assigned to this Class.
10. pH	6.5 - 8.0
11. Allowable temperature increase	None except where the increase will not exceed the recommended limit on the most sensitive receiving water use and in no case exceed 85°F, or in any case raise the normal temperature of the receiving water more than 4°F.

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| 12. | Chemical constituents | None in concentrations or combinations which would be harmful to the most sensitive designated water use. Refer to Standards numbers 10, 11, 12, 13, and 17. |
| 13. | Benthic Invertebrates which inhabit lotic waters | Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. All functional feeding groups and a wide variety of macroinvertebrate taxa shall be present, however one or more may be disproportionate in abundance. Waters which currently support a high quality aquatic community shall be maintained at that high quality. Presence and productivity of taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies); and pollution intolerant Coleoptera (beetles) and Trichoptera (caddis- flies) may be limited due to cultural activities. Macroinvertebrate communities in waters impaired by cultural activities shall be restored to the extent practical through implementation of the department's procedures for control of pollutant discharges to surface waters and through Best Management Practices for non-point sources of pollution. |

CLASSIFICATIONS

- B Known or presumed to meet Water Quality Criteria which support designated uses.
- C/B or D/B Due to point or nonpoint sources of pollution, certain Water Quality Criteria or one or more designated uses assigned to Class B waters are not currently met. The water quality goal is achievement of Class B Criteria and attainment of Class B designated uses.

INLAND SURFACE WATERS

CLASS C

Present water quality conditions preclude the full attainment of one or more designated uses for Class B waters some or all of the time. One or more Water Quality Criteria for Class B waters are not being consistently achieved. Class C waters may be suitable for certain fish and wildlife habitat, certain recreational activities, industrial use and other legitimate uses, including navigation. Class C waters may have good aesthetic value. Class C water quality results from conditions which are usually correctable through implementation of established water quality management programs to control point and nonpoint sources of pollution. Examples of conditions which warrant a Class C designation include; combined sewer overflows, urban runoff, inadequate municipal or industrial wastewater treatment, and community-wide septic system failures. The minimum acceptable class goal is ~~Class B unless a DEP and EPA approved Use Attainability Analysis demonstrates that one of more uses are not attainable.~~ In those situations, site-specific Quality Criteria will be employed in the analysis to insure that all existing uses are maintained. Refer to Standard Number 6.

CLASSIFICATIONS

- C/B, C/A or C/AA Presently not meeting Water Quality Criteria or not supporting one or more assigned designated uses due to pollution. The goal for such waters may be Class AA, A or Class B.

INLAND SURFACE WATERS

CLASS D

Present water quality conditions persistently preclude the attainment of one or more designated uses for Class B waters. One or more Water Quality Criteria for Class B waters are not being achieved most or all of the time. Class D waters may be suitable for bathing or other recreational purposes, certain fish and wildlife habitat, industrial or other legitimate uses, including navigation. Class D waters may have good aesthetic value. Class D water quality results from sources

of pollution which are not readily correctable. Examples of conditions which warrant a Class D designation include contamination of bottom sediments, contamination of fish or shellfish with toxic compounds, and pollution caused by out-of-state sources. The water quality goal is restoration to Class B or Class A conditions. The minimum acceptable class goal is Class B unless a DEP and EPA approved Use Attainability Analysis demonstrates that one or more uses are not attainable. In those situations, site-specific Quality Criteria will be employed in the analysis to insure that all existing uses are maintained. Refer to Standard Number 6.

CLASSIFICATIONS

D/B, D/A - Presently not meeting Water Quality Criteria or not supporting one or more assigned designated uses due to severe pollution. The goal for such waters may be Class A or Class B.

LAKE TROPHIC CLASSIFICATIONS

OLIGOTROPHIC

May be Class AA, Class A, or Class B water. Low in plant nutrients. Low biological productivity characterized by the absence of nuisance macrophyte beds. Excellent opportunities for water contact recreation.

CRITERIA

<u>Parameters</u>	<u>Standard</u>
1. Total Phosphorus	0-10 ug/l spring and summer
2. Total Nitrogen	0-200 ug/l spring and summer
3. Chlorophyll-a	0-2 ug/l mid-summer
4. Secchi Disk Transparency	6 + meters mid-summer

MESOTROPHIC

May be Class AA, Class A, or Class B water. Moderately enriched with plant nutrients. Moderate biological productivity characterized by occasional nuisance blooms of algae and/or small areas of nuisance macrophyte beds. Good opportunities for water contact recreation.

CRITERIA

<u>Parameters</u>	<u>Standard</u>
1. Total Phosphorus	10-30 ug/l spring and summer
2. Total Nitrogen	200-600 ug/l spring and summer
3. Chlorophyll-a	2-15 ug/l mid-summer
4. Secchi Disk Transparency	2-6 meters mid-summer

EUTROPHIC

May be Class AA, Class A, or Class B water. Highly enriched with plant nutrients. High biological productivity characterized by frequent nuisance blooms of algae and/or extensive areas of dense macrophyte beds. Water contact recreation opportunities may be limited.

CRITERIA

Parameters

Standard

- | | | |
|----|--------------------------|---------------------------------|
| 1. | Total Phosphorus | 30-50 ug/l spring and summer |
| 2. | Total Nitrogen | 600-1000 ug/l spring and summer |
| 3. | Chlorophyll-a | 15-30- ug/l mid-summer |
| 4. | Secchi Disk Transparency | 1-2 meters mid-summer |

HIGHLY EUTROPHIC

May be Class AA, Class A, or Class B water. Excessive enrichment with plant nutrients. High biological productivity, characterized by severe nuisance blooms of algae and/or extensive areas of dense macrophyte beds. Water contact recreation may be extremely limited.

CRITERIA

Parameters

Standard

- | | | |
|----|--------------------------|-------------------------------|
| 1. | Total Phosphorus | 50 + ug/l spring and summer |
| 2. | Total Nitrogen | 1000 + ug/l spring and summer |
| 3. | Chlorophyll-a | 30 + ug/l mid-summer |
| 4. | Secchi Disk Transparency | 0-1 meters mid-summer |

TROPHIC CLASSIFICATION OF LAKES

OLIGOTROPHIC LAKES

Lake

Location

Bashan	East Haddam
Beach	Voluntown
Billings	North Stonington
Mashapaug	Union
Riga	Salisbury
Uncas	Lyme
West Hill	New Hartford

MESOTROPHIC LAKES

Lake

Location

Alexander	Killingly
Anderson's Pond	North Stonington
Ball	New Fairfield
Beseck	Middlefield
Bigelow	Union
Black	Meriden and Middlefield
Black	Woodstock
Burr	Torrington
Candlewood	N. Fairfield, Sherman, Danbury, N. Milford, Brookfield
Cedar	Chester
Columbia	Columbia

Cream Hill
Crystal
Dodge
East Twin
Fitchville
Gardner
Glasgo
Gorton
Green Falls
Halls
Hatch Pond
Hayward
Higganum Reservoir
Highland
Hitchcock
Killingly Pond
Little Schoolhouse
Long
Lower Bolton
Mamasasco
Middle Bolton
Mohawk Pond
Moodus
Morey
Mount Tom
Norwich
Mudge
Pachaug
Park
Pataganset
Pattaconk Reservoir
Pocotopaug
Powers
Quaddick
Quonnipaug
Rogers
Shenipsit
South Spectacle
Squantz
Taunton
Terramuggus
Tyler
Wangumbaug
Waramaug
Wauregan Reservoir
West Side
Winchester
Wononscopomuc
Wright's Pond
Wyassup

Cornwall
Ellington, Stafford
East Lyme
Salisbury
Fitchville
Salem, Bozrah, Montville
Griswold
East Lyme
Voluntown
Eastford
Kent
East Haddam
Haddam
Winchester
Wolcott
Killingly
Thompson
Ledyard, North Stonington
Bolton, Vernon
Ridgefield
Vernon
Goshen
East Haddam
Ashford
Litchfield, Morris, Goshen
Lyme
Sharon
Griswold
Winchester
East Lyme
Chester
East Hampton
East Lyme
Thompson
Guilford
Lyme, Old Lyme
Vernon, Ellington, Tolland
Kent
New Fairfield, Sherman
Newtown
Marlborough
Goshen
Coventry
Warren, Washington, Kent
Killingly
Goshen
Winchester
Salisbury
Westbrook, Essex, Deep River
North Stonington

EUTROPHIC LAKES

<u>Lake</u>	<u>Location</u>
Amos	Preston
Aspinook	Lisbon and Canterbury
Avery	Preston
Bantam	Litchfield, Morris
Batterson Park	Farmington, New Britain
Crystal	Middletown
Dog	Goshen
Eagleville	Mansfield
Housatonic	Shelton
Howell	Hartland
Kenosia	Danbury
Leonard	Kent
Lillinonah	Bridgewater, Brookfield
Linsley	Branford, North Branford
Long Meadow	Bethlehem
Moosup	Plainfield
Rainbow Reservoir	Windsor
Red Cedar	Lebanon
Roseland	Woodstock
Wononpakook	Salisbury
Zoar	Newtown, Monroe, Oxford, Southbury

HIGHLY EUTROPHIC LAKES

<u>Lake</u>	<u>Location</u>
Beachdale	Voluntown
Cedar	North Branford
Dooley's	Middletown
1860 Reservoir	Wethersfield
Hanover Pond	Meriden
Holbrook	Hebron
Hopeville	Griswold
Lake of Isles	North Stonington
Lantern Hill	Ledyard, North Stonington
Messerschmidt's	Westbrook, Deep River
North Farms	Wallingford
Pickerel	Colchester
Silver	Berlin, Meriden
West Thompson	Thompson
Winnemaug	Watertown
Wood Creek	Norfolk

COASTAL AND MARINE SURFACE WATERS

CLASS SA

Designated Use - Marine fish, shellfish and wildlife habitat, shellfish harvesting for direct human consumption, recreation, and all other legitimate uses including navigation.

CRITERIA

<u>Parameter</u>	<u>Standard</u>
1. Aesthetics	Uniformly excellent
2. Dissolved oxygen	Not less than 6.0 mg/l at any time.
3. Sludge deposits-solid refuse-floating solids-oils and grease-scum	None other than of natural origin
4. Color	None other than of natural origin
5. Suspended and settleable solids	None other than of natural origin
6. Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity, or dredge material disposal provided all reasonable controls and Best Management Practices are used.
7. Turbidity	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity, or dredging provided all reasonable controls and Best Management Practices are used.
8. Indicator bacteria	Fecal coliform organisms shall not exceed a geometric mean of 14 MPN/100 ml nor shall greater than 10% of samples exceed 43 MPN/100 ml. For established bathing waters enterococcal organisms shall not exceed a geometric mean of 33/100 ml and no single sample shall exceed 61/100 ml. Refer to standard number 23 and Appendix B.
9. Taste and odor	As naturally occurs.
10. pH	6.8 - 8.5
11. Allowable temperature increase	None except where the increase will not exceed the recommended limit on the most sensitive receiving water use and in no case exceed 83°F or in any case raise the normal temperature of the receiving water more than 4°F. During the period including July, August and September, the normal temperature of the receiving water shall not be raised more than 1.5°F unless it can be shown that spawning and growth of indigenous organisms will not be significantly affected.
12. Chemical constituents	None in concentrations or combinations which would be harmful to the most sensitive designated water use. Refer to Standards numbers 10, 11, 12, 13 and 17.

CLASSIFICATIONS

- SA Know or presumed to meet Water Quality Criteria which support designated uses.
- SB/SA or SC/SA Presently not meeting Water Quality Criteria or one or more designated uses. The water quality goal is achievement of Class SA Criteria and attainment of Class SA designated uses.

COASTAL AND MARINE SURFACE WATERS

CLASS SB

Designated Uses - Marine fish, shellfish and wildlife habitat, shellfish harvesting for transfer to a depuration plant or relay (transplant) to approved areas for purification prior to human consumption, recreation, industrial and other legitimate uses including navigation.

CRITERIA

<u>Parameter</u>	<u>Standard</u>
1. Aesthetic	Good to excellent
2. Dissolved oxygen	Not less than 5.0 mg/l at any time.
3. Sludge deposits - solid refuse	None except for small amounts that floating solids-oils and may result from the discharge from a grease-scum-waste treatment facility providing appropriate treatment.
4. Color	None resulting in obvious discoloration of the receiving water outside of any designated zone of influence.
5. Suspended and settleable solids	None in concentrations or combinations which would impair the most sensitive designated use; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of bottom sediments; none which would adversely impact organisms living in or on the bottom sediments.
6. Sand or silt deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity, or dredging provided all reasonable controls and Best Management Practices are used.
7. Turbidity	None other than of natural origin except for small amounts that may result from the discharge from a waste treatment facility providing appropriate treatment. All reasonable controls and Best Management Practices to be used.
8. Indicator bacteria	As an indicator of general sanitary quality, Fecal coliform shall not exceed a geometric mean of 200 organisms/100ml nor shall 10% of the samples exceed 400 organisms/100 ml. For designated shellfish harvesting areas fecal coliform organisms shall not exceed a geometric mean of 88 MPN/100 ml nor shall greater than 10% of samples exceed 260 MPN/100 ml. For established bathing waters, enterococcal organisms shall not exceed a geometric mean of 33/100 ml and no single sample shall exceed 61/100 ml. Refer to Standard number 23 and Appendix B.
9. Taste and odor	As naturally occurs. None that would impair any usages specifically assigned to this Class.
10. pH	6.8 - 8.5
11. Allowable temperature increase	None except where the increase will not exceed the recommended limit on the most sensitive receiving water use and in no case exceed 83°F or in any case raise the normal temperature of the receiving water more than 4°F. During the period including July, August and September, the normal temperature of the receiving water shall not be raised more than 1.5°F unless it can be shown that spawning and growth of indigenous organisms will not be significantly affected.

12. Chemical constituents None in concentrations or combinations which would be harmful to the most sensitive designated water use. Refer to Standards numbers 10, 11, 12, 13 and 17.

CLASSIFICATIONS

- SB Known or presumed to meet Water Quality Criteria which support designated uses.
- SC/SB or SD/SB Due to point or nonpoint sources of pollution, certain Water Quality Criteria or one or more designated uses assigned to Class SB waters are not currently met. The water quality goal is achievement of Class SB criteria and attainment of Class SB designated uses.

COASTAL AND MARINE SURFACE WATERS

CLASS SC

May be suitable for fish, shellfish, and wildlife habitat, certain aquaculture operations, recreational uses, industrial and other legitimate uses including navigation. Present water quality conditions preclude the full attainment of one or more designated uses some of all of the time. One or more Water Quality Criteria are not being consistently achieved. Examples of conditions which warrant a Class SC designation include conditions such as combined sewer overflows, urban runoff, inadequate municipal or industrial wastewater treatment, or community-wide septic system failures which can be corrected through implementation of established water quality management programs. Where the water quality goal is Class SA or SB, a DEP and EPA approved Use Attainability Analysis may be performed to demonstrate that one or more uses are not attainable. In those situations, site specific Quality Criteria will be employed in the analysis to insure that all existing uses are maintained. Refer to Standard Number 6.

CLASSIFICATIONS

- SC/SB or SC/SA Presently not meeting Water Quality Criteria or not supporting one or more assigned designated uses due to pollution. The goal for such waters may be Class SB, or Class SA.

COASTAL WATERS

CLASS SD

Present water quality conditions persistently preclude the attainment of one or more designated uses for Class SB waters. One of more Water Quality Criteria for Class SB waters are not being achieved most or all of the time. Class SD waters may be suitable for bathing or other recreational purposes, certain fish and wildlife habitat, industrial or other legitimate uses, including navigation, may have good aesthetic value. Class SD water quality results from sources of pollution which are not readily correctable through implementation of established State water quality management programs to control point and nonpoint sources of pollution. Examples of conditions which warrant a Class SD designation include contamination of bottom sediments, contamination of fish or shellfish with toxic compounds, and pollution caused by out-of-state sources. The water quality goal is restoration to Class SB or Class SA conditions. Where the water quality goal is Class SA or SB, a DEP and EPA approved Use Attainability Analysis may be performed to demonstrate that one or more uses are not attainable. In those situations, site specific Quality Criteria will be employed in the analysis to insure that all existing uses are maintained. Refer to Standard Number 6.

CLASSIFICATIONS

- SD/SB, SD/SA Presently not meeting Water Quality Criteria or not supporting one or more assigned designated uses due to severe pollution. The goal for such waters may be Class SA or Class SB

IV. GROUND WATER QUALITY STANDARDS

- GW1.** The policy of the Department in areas that are classified as GAA, GAA,, or GA is to maintain or restore all ground water in such areas to its natural quality.
- GW2.** If the Commissioner determines that, with respect to a particular pollutant, restoring or maintaining natural quality at a GAA, GAA,, or GA level is not technically practicable, the Department's policy is to:
- (A) Maintain or restore quality such that the ground water is suitable for drinking and other domestic uses without treatment, and
 - (B) Maintain or restore quality such that the ground water will not adversely affect surface water quality or prevent the maintenance or attainment or any designated uses of surface waters to which that ground water discharges, and
 - (C) Eliminate sources of pollution to such ground water to the extent that the Commissioner determines to be technically practicable, and regulate discharges to such groundwater so as to prevent pollution.
- GW3.** Ground water is deemed suitable for drinking and other domestic uses without treatment when no pollutant in such groundwater (A) exceeds a level which the Commissioner of Public Health has determined, pursuant to Section 22a-471 of the General Statutes, creates or reasonably can be expected to create an unacceptable risk of injury to the health or safety of persons using such ground water for drinking or other personal or domestic use, (B) is a carcinogen present at a concentration associated with a 1×10^{-6} excess cancer risk, (C) is a non-carcinogen present at a level exceeding that to which the human population, including sensitive subgroups, can be exposed on a daily basis without appreciable risk of adverse health effects during a lifetime, or (D) exceeds a level which the Commissioner determines, in consultation with the Commissioner of Public Health, renders the ground water so aesthetically impaired that a person cannot reasonably be expected to consume or otherwise use it.
- GW4.** The policy of the Department in areas classified as GB is:
- (A) To eliminate or reduce in the ground water any pollutant which presents a hazard of fire, explosion, or toxic or hazardous emission to the environment or otherwise poses a threat to public safety or an unacceptable risk to public health, and
 - (B) To maintain the ground water at a quality that will not adversely affect the quality of surface waters to which such ground water discharges or prevent the maintenance or attainment of any designated or existing uses in such surface waters, and
 - (C) To maintain a quality consistent with all designated and existing uses of the ground water, including its use for drinking without treatment if such ground water has, prior to the adoption of these Water Quality Standards, been utilized for, and continues to be utilized, for drinking water, and
 - (D) To regulate discharges to the ground water in order to prevent further degradation of ground water quality.
- GW5.** The policy of the Department in areas classified as GC is:
- (A) To eliminate or reduce in the ground water any pollutant which presents a hazard of fire, explosion, or toxic or hazardous emission to the air or otherwise poses a threat to public safety or an unacceptable threat to public health, and

- (B) To maintain the ground water at a quality that will not adversely affect the quality of surface waters to which such ground water discharges or prevent the maintenance or attainment of any designated or existing uses in such surface waters, and
 - (C) To limit the impacts of waste discharges on ground water quality to those which, despite the use of treatment technology, cannot be avoided and which result from a discharge which is authorized by a permit under Section 22a-430 of the General Statutes.
- GW6.** With respect to ground water whose quality is actually higher than that reflected by the assigned classification, the Department's policy is that such ground water should be maintained at its existing high quality. To maintain such quality, the Commissioner may require that:
- (A) A new, increased, or otherwise modified discharge to such ground water shall be given treatment such that, notwithstanding such classification, the actual higher quality is maintained.
 - (B) If after the adoption of these Water Quality Standards there is an unpermitted release of pollutants to ground water which is classified GB but whose quality is actually GA or GAA, such groundwater shall be remediated to the standards for Class GA or GAA.
- GW7.** The Commissioner may raise the ground water classification of any area if he finds that such ground water meets the standards for the higher classification.
- GW8.** (A) The Commissioner may consider an application to lower a ground water classification to GB. Such application shall be subject to the public participation requirements of Section 22a-426 of the General Statutes and shall:
- (i) describe the nature and extent and date of commencement of pollution of the ground water proposed to be reclassified,
 - (ii) identify all sources of drinking water in the area whose ground water is proposed to be reclassified and identify all existing uses of ground water within and down gradient of such area,
 - (iii) assess the potential of the subject area to produce ground water in an amount suitable for a public water supply,
 - (iv) describe all past and present land uses in the subject area, with dates, and
 - (v) provide such other information the Commissioner may reasonably require to determine the most appropriate ground water classification.
- (B) A ground water classification shall not be lowered to GB unless the applicant has satisfactorily demonstrated that; any person within or down gradient of the area to be reclassified and extending to an area previously classified as GB or to a surface water body to which the groundwater discharges will be provided with an adequate public water supply, and that lowering of a ground water classification will not prevent attainment of adjacent surface water quality goals or present unacceptable health risks, and
- (i) That the ground water to be reclassified is polluted as a result of intense urban, commercial, or industrial development which occurred prior to 1981, and the hydrologic conditions of the subject area are not suitable for the development of a significant public water supply, or

- (ii) The ground water proposed to be reclassified is polluted and remediation of such ground water to a quality suitable for drinking without treatment is not technically practicable, or
- (iii) There is an overriding social or economic justification for reclassifying the ground water to GB and the proposed reclassification is supported by the affected municipality or municipalities, as affirmed, in writing, by the chief executive officer(s) of the municipality or municipalities. For the purpose of this Standard an "affected municipality" is one in which ground water classifications are to be altered, "social justification" means a specific social need of the affected municipality or the state and "economic justification" means avoidance of an economic impact that would substantially impair or otherwise detrimentally affect the economy of the community or the state. The applicant must also demonstrate that the purposes for the reclassification will not result in development that is inconsistent with the State Policies Plan for Conservation and Development as adopted pursuant to Section 16a-30 of the General Statutes.

GW9. The Commissioner may consider an application to lower a ground water classification to GC. Any such application shall be subject to the public participation requirements of Section 22a-426 of the General Statutes and:

- (A) Such application shall be accompanied by a completed application under Section 22a-430 of the General Statutes for a permit to discharge leachate from a solid waste land disposal facility to the subject ground water.
- (B) A ground water classification shall not be lowered to GC unless the applicant has satisfactorily demonstrated that:
 - (i) there is an overriding social or economic justification for reclassifying the ground water to GC and the affected municipality or municipalities have been notified of the proposed reclassification; and
 - (ii) the ground water proposed to be reclassified is not suitable for development of a significant public water supply and is suitable for waste treatment; and
 - (iii) the subject area is adjacent to and hydraulically connected with a surface water body classified B or SB; and
 - (iv) in a Section 22a-430 permit application the applicant has delineated the zone of influence (see standard GW10) of the ground water proposed to be reclassified as extending from the proposed solid waste land disposal facility to the receiving surface water body, and the applicant owns the land overlying such zone of influence, or has an easement with respect to such land which easement is properly recorded and provides protections, as described in subsection D(1) and D(2) of Standard GW10, or otherwise controls the zone of influence to the satisfaction of the Commissioner.

GW10. Zones of influence. The Commissioner may establish zones of influence when, in the course of permitting discharges to the ground water under Section 22a-430 of the General Statutes, he allocates ground water and soil resources for the treatment of pollutants. Within that zone of influence the Section 22a-430 permittee will be allowed to degrade the ground water such that it may not meet the standards for the assigned classification or be suitable for uses designated by these Water Quality Standards for such classification.

- A. For a subsurface sewage disposal system permitted under authority delegated pursuant to Section 22a-430-1 of the Regulations of Connecticut State Agencies to the Commissioner of Health and Addiction Services, the zone of influence shall be that area required by the minimum separating distances established in Section 19-13-B103d of the Regulations of Connecticut State Agencies.

- B. For discharges to ground water of treated domestic sewage other than discharges of domestic sewage identified in subparagraph GW10(A), agricultural wastes, and storm water, the zone of influence shall be the area in which such discharge causes the ground water to be 1) altered in quality from its natural condition, or 2) lowered in quality from that which is suitable for drinking and other domestic uses without treatment. The Commissioner may require the applicant for a permit under Section 22a-430 of the General Statutes to submit for the Commissioner's approval an engineering plan showing the areal extent of any such zone of influence.
- C. The applicant for a permit under Section 22a-430 of the General Statutes authorizing a discharge other than a discharge of treated domestic sewage, agricultural waste, or storm water shall delineate the zone of influence associated with the proposed discharge. Such zone of influence shall include all areas beneath which the ground water which is or may be affected in quality by such discharge. The Commissioner may require that such zone of influence extend to a receiving water body with a classification of B or SB.
- D. The Commissioner may require the applicant for a permit under Section 22a-430 of the General Statutes to demonstrate that he has acquired rights to the zone of influence of the proposed discharge. Acquisition of such rights means that the applicant owns the land overlying such zone, has obtained an easement with respect to such land and has recorded such easement in the applicable Town Clerk's office, or otherwise controls such zone to the Commissioner's satisfaction. Any such easement or other control mechanism shall: 1) provide the applicant with the exclusive right to use the ground water in such zone and such right to enter the land overlying such zone as the Commissioner deems necessary to accommodate monitoring or remediation, and 2) assure that the ground water within such zone will not be used for potable water supply.
- E. The delineation by a Section 22a-430 permit applicant of the zone of influence of a proposed waste discharge indicates that the underlying ground water may not be suitable for human consumption or other uses. Installation of a withdrawal well in or near such a zone of influence may result in an induced flow of polluted ground water to such well. When reviewing an application to withdraw groundwater pursuant to Connecticut's Water Diversion Policy Act, General Statutes Sections 22a-365 et seq., the Commissioner considers the potential impacts on water quality attributable to induced flow of polluted water from a zone of influence associated with a waste discharge.

GW11. The Department's classification of ground water, whether as GB, GC, or otherwise, conveys no right to degrade that ground water or to utilize less effective treatment measures than those utilized for discharges to groundwater designated for use as potable water. Domestic sewage shall be given the same treatment regardless of the classification of the groundwater to which such sewage is discharged.

GW12. The Commissioner applies the following policies in reviewing applications under Section 22a-430 of the General Statutes to discharge waste to ground water:

- A. *Class GAA Ground Waters:* The Commissioner does not issue permits authorizing a discharge to class GAA ground water unless such discharge is of treated domestic sewage as defined in Section 22a-430-1 of the Regulations of Connecticut State Agencies, waste generated by certain agricultural practices, certain water treatment waste waters from public water supply treatment systems, or certain minor cooling waters or clean waters. If a GAA area is within an Aquifer Protection Area designated in accordance with Section 22a-354 of the General Statutes, the Commissioner does not issue permits authorizing a groundwater discharge that conflicts with any regulation adopted pursuant to Section 22a-354(i) of the General Statutes.
- B. *Class GAA, Ground Waters:* The Commissioner does not issue permits authorizing a discharge to class GAA, ground water unless such discharge is of treated domestic sewage as defined in Section 22a-430-1 of the Regulations of Connecticut State Agencies, waste generated by certain agricultural

practices, certain water treatment waste waters from public water supply treatment systems, or certain minor cooling waters or clean waters. If a GAA area is within an Aquifer Protection Area designated in accordance with Section 22a-354 of the General Statutes, the Commissioner does not issue permits authorizing a groundwater discharge that conflicts with any regulation adopted pursuant to Section 22a-354(i) of the General Statutes.

- C. *Class GA Ground Waters:* The Commissioner does not issue permits authorizing a discharge to class GA ground water unless such discharge is allowed under subparagraph (A) of this standard or is a discharge from a septage treatment system or of other wastes that are predominantly human, plant, or animal in origin so long as any such wastes are of natural origin, easily biodegradable and, if properly managed, pose no threat of pollution to the ground water. The ground water plume generated by a discharge of septage treatment system must terminate in a stream with classification of B or SB unless the permittee treats the discharge in a manner which the Commissioner determines is adequate to maintain class A water in the receiving stream.
- D. *Class GB Ground Waters:* The Commissioner may issue permits authorizing a waste discharge to class GB ground water if such discharge would be allowable in a GA area under subparagraph (C) of this standard or if such discharge meets all of the following criteria:
 - (i) The Commissioner has determined that such waste is generated by a source which is unlikely to produce persistent pollutants or pollutants that do not biodegrade in soil.
 - (ii) The waste will be treated as necessary to render it amenable to attenuation by the receiving soil so that the groundwater will not be impaired.
 - (iii) Such discharge otherwise conforms with all applicable legal requirements and standards.
- E. *Class GC Ground Waters:* The Commissioner may issue permits authorizing a discharge to class GC ground water of any material, provided such discharge otherwise conforms with all applicable legal requirements and standards.

GW13. The Commissioner may issue a permit authorizing a discharge of material to ground water, even if such discharge would be inconsistent with subparagraph (A), (B), (C), or (D) of Standard GW12, provided such discharge otherwise conforms with all applicable legal requirements and standards, is necessary to remediate groundwater pollution, and is treated or managed such that, to the maximum extent practicable, the discharge does not impair public health or the environment.

V. GROUND WATER CLASSIFICATIONS AND CRITERIA

CLASS GAA

Designated Uses: Existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically-connected surface water bodies.

CRITERIA

<u>Parameter</u>	<u>Criterion</u>
1. Dissolved Oxygen	As naturally occurs.
2. Oils and grease	None other than of natural origin.
3. Color and turbidity	None other than of natural origin.
4. Coliform bacteria	None other than of natural origin.
5. Taste and odor	None other than of natural origin.
6. pH	As naturally occurs.
7. Chemical constituents	As naturally occurs.

Sub-Classifications of Class GAA

GAA Ground water used or which may be used for public supplies of water suitable for drinking without treatment; ground water in the area that contributes to a public drinking water supply well; and ground water in areas that have been designated as a future water supply in an individual water utility supply plan or in the Area wide Supplement prepared by a Water Utility Coordinating Committee pursuant to Title 25 of the General Statutes.

GAA Ground water that is tributary to a public water supply reservoir.

CLASS GA

Designated Uses: Existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow for hydraulically-connected surface water bodies.

CRITERIA

<u>Parameter</u>	<u>Criterion</u>
1. Dissolved oxygen	As naturally occurs.
2. Oils and grease	None other than of natural origin.
3. Color and turbidity	None other than of natural origin.
4. Coliform bacteria	None other than of natural origin.
5. Taste and odor	None other than of natural origin.
6. pH	As naturally occurs.
7. Chemical constituents	As naturally occurs.

CLASSIFICATIONS

GA Ground water within the area of existing private water supply wells or an area with the potential to provide water to public or private water supply wells. The Department presumes that ground water in such an area is, at a minimum, suitable for drinking or other domestic uses without treatment.

CLASS GB

Designated Uses: Industrial process water and cooling waters; baseflow for hydraulically-connected surface water bodies; presumed not suitable for human consumption without treatment.

CRITERIA

Ground waters of this class are assumed by the Department to be degraded due to a variety of pollution sources. No specific groundwater quality criteria apply except those that may be promulgated as part of the Site Remediation Regulations required by Section 22a-133k of the General Statutes

CLASSIFICATIONS

GB Ground water within a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such ground water may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts.

CLASS GC

Designated Uses: Assimilation of discharges authorized by the Commissioner pursuant to Section 22a-430 of the General Statutes.

CRITERIA

No quantitative criteria are specifically determined until such time as a person applies to the Department under Section 22a-430 of the General Statutes to discharge leachate to ground water. The most important consideration in making a determination to classify ground water as GC is the impact of any authorized ground water discharges on adjacent surface waters.

CLASSIFICATIONS

GC Ground water to which the Commissioner has authorized a discharge under Section §22a-430 of the General Statutes. In the course of applying for Section §22a-430 authorization, the permittee performed all necessary hydrogeologic studies, secured legal rights to all affected ground waters, and complied with all other requirements of Connecticut's Water Quality Standards and any other applicable law. Ground waters classified as GC are not suitable for development of public supplies of potable water.

APPENDIX A

CONNECTICUT ANTI-DEGRADATION IMPLEMENTATION POLICY

I. PURPOSE. The purpose of this document is to establish implementation procedures to carry out Connecticut's anti-degradation policy as required by the Federal Clean Water Act (40 CFR 131.12) and stated in Connecticut Water Quality Standards 2 through 5. The anti-degradation policy requires the maintenance and protection of water quality in high quality waters.

II. APPLICABILITY. The procedures outlined in this policy would apply to any proposed new or increased discharge to the surface waters of the state or any activity requiring a permit pursuant to Chapters 440, 446i-k, and 368 of the Connecticut General Statutes or requiring Water Quality Certification pursuant to Section 401 of the Clean Water Act.

III. SURFACE WATER RESOURCES TO BE MAINTAINED AT EXISTING HIGH QUALITY. No permit or certification may be issued for any discharge or activity in the following waters:

1) Outstanding National Resource Waters

Where high quality waters constitute an outstanding National resource, such as waters of National and State parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. The lowering of water quality is prohibited in Outstanding National Resource Waters except where limited activities will result in only temporary or short term insignificant changes in water quality.

2) Class A or AA waters

unless:

- (a)(1) a temporary discharge is necessary to remediate an existing surface or groundwater pollution problem
or

(a)(2) the discharge consists of clean water, treated backwash waters from public or private drinking water treatment systems or dredging and dredged material dewatering operations and does not result in violation of Class A or AA standards;

(b) for nonpoint source discharges, appropriate Best Management Practices as determined by the Commissioner are employed; and

(c) in all cases the Commissioner finds that existing or designated uses will be protected fully. Existing uses are defined in 40 CFR 131.12 those which have occurred on or after November 28, 1975.

High quality Class B or SB water resources are those with existing quality better than established standards for that class and which meet all designated use goals. These waters will be maintained at their existing high quality,

unless

(a) the Commissioner finds, after adequate opportunity for intergovernmental and public participation, that allowing lower water quality is necessary to accommodate overriding State economic or social development in accordance with paragraph IV.2 of this document or

(b) the Commissioner finds that the resulting change in water quality is not significant in accordance with paragraph IV.1 of this document; and,

(c) in all cases, the Commissioner finds that existing and designated uses will be protected fully.

IV. ANTI-DEGRADATION EVALUATION PROCEDURES FOR CLASS B AND SB WATER RESOURCES

1) Determination of significant lowering of water quality - The Commissioner will make a determination of whether a proposed discharge or activity will result in a significant change in water quality by utilizing all available data and the best professional judgement of Department staff. Factors to be considered in making this determination include, but are not limited to:

- (a) percent change in a water quality parameter;
- (b) quality and value of the resource;
- (c) cumulative impact of discharges and/or activities on water quality;
- (d) impact on aquatic biota and habitat;
- (e) eutrophic impacts;
- (f) impact on existing, designated, and potential uses; and
- (g) percent of remaining assimilative capacity for the water resource.

2) Determination that allowing lower water quality is necessary to accommodate overriding economic and social development - If it is determined that a proposed discharge or activity will result in a significant lowering of water quality in a high quality Class B or SB water resource, no permit or certification will be issued unless the Commissioner finds that allowing lower water quality is necessary to accommodate overriding economic and social development which the Commissioner has determined is clearly in the public interest, and that existing uses will be protected fully.

- (a) The proposed lowering of water quality will be found to be necessary only if the applicant demonstrates to the satisfaction of the Commissioner that:

- alternatives are not technologically feasible, or
- applicable pollution control alternatives are prohibitively expensive.

Alternatives studied should include but are not necessarily limited to:

- alternative discharge locations
- reduction in scale of the project
- pollution prevention measures
- water recycle or reuse
- process changes and/or innovative technology
- improved operation and maintenance of existing facilities

- (b) The burden of proof is on the applicant to show the overriding economic or social benefits to the State which will result from the proposed activity, including any mitigation. The applicant shall also discuss the loss or reduction of natural resource benefits associated with lower water quality. These benefits include but are not limited to active and passive recreation, aquatic life, aquatic habitat including riparian vegetation and intrinsic values such as aesthetic appreciation of the water resource.
- 3) As required by WQS (4), the Commissioner shall require the highest statutory and regulatory requirements for all new and existing point sources. All cost-effective and reasonable Best Management Practices for nonpoint source discharges must be utilized.
- 4) The Commissioner may periodically review available treatment technology and reconsider any prior decisions in accordance with Section 22a-431 of the General Statutes.
- 5) Public Participation - Anti-degradation issues will be evaluated in conjunction with permit or certification issuance described in Section II above. For activities where anti-degradation applies, the Public Notice for the proposed activity will contain the Commissioner's finding regarding compliance with the anti-degradation policy.
- 6) The Commissioner may take into consideration all other mitigating factors not included within these procedures in making a decision.

APPENDIX B

GUIDELINES FOR USE OF CRITERIA FOR INDICATOR BACTERIA

The indicator bacteria criteria established in Connecticut Water Quality Standards identify the minimum requirements for sanitary quality necessary to support the uses designated for each Class of waters. Three uses in particular are sensitive to bacterial contamination; drinking water supply, shellfish harvesting, and contact recreation (bathing). Three groups of indicator bacteria, total coliform, fecal coliform, and Enterococci, are used in Connecticut Water Quality Standards to establish the sanitary quality of waters relative to the support of these designated uses. The results of bacteriological analysis of a water sample also depends to a degree on the methodology used to determine bacterial densities. In practice, both the indicator organism and the method of measurement must be known to make valid assessments of sanitary quality.

Water Quality Classifications for individual waterbodies are reviewed approximately every three years at which time all available water quality monitoring data is considered. Public input is also solicited and considered in determining the appropriate Classification to identify current quality and future quality goals. Nevertheless, the Water Quality Classification may not be an accurate representation of the current water quality conditions at any particular site. For this reason, the Water Quality Classification should not be considered as a certification of quality by the State or an approval to engage in certain activities such as swimming or shellfish harvesting.

Total coliform bacteria have traditionally been widely used as surrogates for pathogenic organisms normally associated with sewage to indicate the possible contamination of surface and ground waters including evaluation of the sanitary quality of drinking water. However, total coliform bacteria also originate in the intestines of other warm blooded animals, as well as sources which have little sanitary significance such as plants and soils (see also Standard 22). The Public Health Code, adopted pursuant to Section 19-13 of the Connecticut General Statutes, establishes sanitary criteria for untreated drinking water supplies based on total coliform densities determined using the Membrane Filter method described in the most recent edition of Standard Methods. The Connecticut Department of Health Services is designated as the lead agency with the authority to regulate the sanitary quality of public drinking water supplies and certify laboratories for analysis of the sanitary quality of surface and ground waters.

Fecal coliform bacteria comprise a portion of the total coliform group and may be more specific to bacteria of sanitary significance. Fecal coliform density as determined using the Multiple Tube Fermentation method has been designated as the preferred means of assessing the sanitary quality of marine waters with respect to shellfish harvesting. Public Act 89-321 assigns to the Department of Agriculture, Aquaculture Division (DA/AD) the responsibility for regulating the harvesting of shellfish in Connecticut waters. Consistent with this authority, the DA/AD has begun the process of classifying shellfish growing areas with respect to authorized use and sanitary quality in accordance with Federal regulations. The DA/AD has established shellfish growing area classifications (following table) based in part on monitoring of fecal coliform densities consistent with Interstate Shellfish Sanitation Conference (ISSC) National Shellfish Sanitation Program Manual of Operations, Parts I and II.

Additional information on the shellfish growing area classifications used by DA/AD for regulation of shellfish harvesting is provided in the tables which follow. Due to differences in the procedures used to classify waters, some inconsistencies may exist between the Connecticut Water Quality Classification adopted by DEP and the DA/AD Classification of shellfish growing areas. For example, the DA/AD may classify an area as PROHIBITED due to a lack of sufficient monitoring data to satisfy federal/ISSC mandates when, in fact, actual water quality would not result in contamination of the shellfish resource. In this instance, the shellfish classification does not accurately reflect true water quality conditions but rather indicates a shortfall in State and local resources to conduct monitoring. Situations may also arise in which monitoring to verify sanitary quality conducted by DA/AD and local authorities may uncover an area of previously unknown contamination. Here the DEP Water Quality Classification must be revised to reflect actual quality and corrective actions implemented to restore the use of the area for shellfishing. Each triennial revision of the Water Quality Classifications for marine waters will reduce the number of both types of inconsistencies as more direct and intensive monitoring data for Long Island Sound waters is available.

Enterococci have been adopted by the DEP and the Department of Health Services (DHS) as the preferred indicator for evaluation of the sanitary quality of established bathing waters. Enterococci are a subgroup of the fecal streptococci group and are more fecal specific than other commonly used indicators such as total coliform or fecal coliform bacteria. However, they also can be found in domestic animals and birds as well as humans. The local Director of Health is responsible for determining the sanitary quality of bathing waters and closure of waters found not to meet minimum criteria. Enterococci densities are determined using the Membrane filter method using mE agar as described in Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure (USEPA 600/4-85/076). Procedures for monitoring and closure of bathing areas by Local Health Authorities are specified in Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by DEP and DHS in May 1989.

Prior to this revision, the Water Quality Standards included a fecal coliform criteria for evaluation of the sanitary quality of fresh waters as related to use for contact recreation. This criteria is now being replaced with a criteria for established bathing areas which utilizes Enterococci as indicator organism. The old fecal coliform criteria, however, is being retained as a guideline for evaluation of the general sanitary quality of waters relative to maintaining all designated uses for Class B waters:

Fecal coliform shall not exceed a geometric mean indicator density of 200/100ml in any group of samples nor shall greater than 10% of samples exceed 400/100ml.

A fecal coliform guideline is desirable for several reasons. First, fecal coliform is a more general, broad-based indicator of sanitary quality than Enterococci and may be more useful in identifying and locating sources of sewage contamination in certain situations. Also, there exists a large body of historical monitoring data for fecal coliform densities in surface waters which can be useful in monitoring trends in surface water quality. Facilities which treat sanitary waste use fecal coliform density as a measure of disinfection efficiency. Currently the NPDES discharge permits for all sewage treatment plants in Connecticut include limits on fecal coliform density in the effluent as a means of ensuring that adequate disinfection has taken place prior to discharge. Finally, due to the more widespread past use of the fecal coliform analysis in comparison to the Enterococcal test, the Fecal coliform guideline provides a useful monitoring device during the transition period to greater reliance on the Enterococcal test for sanitary quality.

BACTERIAL INDICATORS OF SANITARY QUALITY FOR DESIGNATED USES ESTABLISHED IN CONNECTICUT WATER QUALITY STANDARDS

<u>DESIGNATED USE</u>	<u>CLASSES</u>	<u>INDICATOR</u>	<u>INDICATOR BACTERIA CRITERIA</u>
Drinking Water Supply Suitable for drinking following disinfection and chemical treatment.	AA A	Total Coliform (MF)	Shall not exceed a monthly moving average of 100/100 ml for the most recent 12 months. No individual sample shall exceed 500/100 ml.
Contact Recreation Established bathing waters	A B SA SB	Enterococci (MF)	Shall not exceed a geometric mean indicator density of 33/100 ml. No single sample shall exceed 61/100 ml.
Shellfish Growing Areas for Direct Consumption (DA/AD Classified as APPROVED)	SA	Fecal Coliform (MPN)	Shall not exceed a geometric mean of 14 MPN/100 ml. No more than 10% of samples shall exceed 43 MPN/100 ml.
Shellfish Growing Areas for Indirect Consumption following transfer to a Depuration Plant or DA/AD approved Area for purification. (DA/AD Classified as RESTRICTED-DEPURATION)	SB SB/SA	Fecal Coliform (MPN)	Shall not exceed a geometric mean of 88 MPN/100 ml. No more than 10% of samples shall exceed 260 MPN/100 ml.

<u>DESIGNATED USE</u>	<u>CLASSES</u>	<u>INDICATOR</u>	<u>INDICATOR BACTERIA CRITERIA</u>
Shellfish Growing Areas for Indirect Consumption following transfer to an DA/AD Approved area for purification. (DA/AD Classified as RESTRICTED-RELAY)	SB SB/SA	Fecal Coliform (MPN)	Criteria established on a site-specific basis by DA/AD following a sanitary survey.
Shellfish Growing Areas for certain aquaculture operations only. (DA/AD Classified as PROHIBITED)	SC/SA SC/SB SD/SA SD/SB	Fecal Coliform (MPN)	Does not meet SB criteria. Sanitary survey indicates that transfer of shellfish to DA/AD Approved Area will not be an effective means of protecting human health from possible adverse effects.

SHELLFISH GROWING AREA CLASSIFICATIONS
ESTABLISHED BY
THE CONNECTICUT DEPARTMENT OF AGRICULTURE / AQUACULTURE DIVISION

<u>Approved</u>	Approved by the DA/AD for growing or harvesting shellfish for direct marketing as licensed by DA/AD and recreational shellfishing. Classification is determined through a sanitary survey conducted by DA/AD with local assistance. May be temporarily closed during a public health emergency is declared resulting from, for example, a hurricane or flooding.
<u>Restricted-Depuration</u>	Use is restricted to harvesting of shellfish by DA/AD licensed operators for transfer to a Depuration Plant or to an Approved Area for purification. These shellfish may not be directly marketed or consumed prior to the purification process. These areas require sanitary surveys and must meet specified bacteriological standards.
<u>Restricted-Relay</u>	Use is restricted to harvesting of shellfish by DA/AD licensed operators. Shellfish must be transferred to an Approved Area for natural purification prior to marketing and consumption. Transfer to a depuration plant is not allowed. A sanitary survey is required.
<u>Prohibited</u>	Harvesting of shellfish is prohibited except for certain aquaculture operations licensed by DA/AD such as harvesting of seed oysters for transplant to clean growing areas. This classification results from the presence of conditions that could pose a health hazard such as severe pollution or marine biotoxins. The DA/AD may also prohibit shellfishing in areas where insufficient sanitary survey and water quality information exist to establish an appropriate classification.

Conditional Use

The DA/AD may classify certain shellfishing areas as Conditionally Approved or Conditionally Restricted if it is determined by the DA/AD that the area will meet the criteria established for an Approved or Restricted classification for a predictable period. A conditional classification may be based on seasonal, meteorological or wastewater treatment plant performance characteristics which can be related in a predictable way to the sanitary quality of the shellfish growing area. If the conditions established by DA/AD are met, the area can be used for shellfish harvesting (either Approved or Restricted as Classified); if the conditions are not met, shellfish harvesting in the area would be prohibited until conditions improve. Water Quality Classifications for marine waters which are conditionally classified by DA/AD are determined on a case-by-case basis by DEP taking into consideration the cause and frequency of any restrictions on use.

- A sanitary survey, as referenced here, consists of a shoreline survey to identify and assess potential pollution sources, meteorological effects, water quality examination and assessment using prescribed standards, and corrective action where necessary. Sanitary surveys are required for all shellfish growing area classifications with the exception of PROHIBITED.

APPENDIX C

DEFINITIONS

Acute Toxicity	Adverse effect such as mortality or debilitation caused by a brief exposure to a relatively high concentration of a toxic substance.
Ambient	Normally occurring conditions in a waterbody.
Anti-degradation	A statement of practice required by federal law which prohibits a state from lowering surface water quality classifications or standards in order to accommodate new or increased wastewater discharges or land use practices which impact a particular water course. The state must attain, and maintain the most sensitive existing and potential use for a respective waterbody.
Arithmetic Mean	The average, calculated by dividing the sum of all values by the number of values to be averaged.
Benthic	Refers to organisms or material associated with the bottom of watercourses.
Benthic Macroinvertebrates	Animals large enough to be seen by the unaided eye and can be retained by a U. S. standard No. 30 sieve (28 meshes per inch, 0.595 mm openings). They must live at least part of their life cycle within or upon submerged substrates in a body of water. These animals usually consist of the aquatic life stages of various insects and arthropods, molluscs, leeches and worms. The benthic community is widely used for the environmental assessment of flowing waters. The structure of this community is a function of environmental conditions during the life span of the organisms. Consequently, community structure can be altered by the effects of pollution, including intermittent events which could be easily missed by conventional chemical/physical indicators. The well-being of the benthic community is frequently reflected in the well-being of higher forms of aquatic life, such as fish.
Best Management Practices	Those practices which reduce pollution of the waters of the state and which have been determined by the Commissioner to be acceptable based on, but not limited to, technical, economic and institutional feasibility.
Bioaccumulate	The uptake and retention of substances by an organism from its surrounding medium and/or from food.
Bioconcentrate	The uptake and retention of substances by an organism from its surrounding medium to levels which exceed the concentration of that substance in the medium.
Chronic Toxicity	Adverse effect, such as reduced reproductive success or growth, poor survival of sensitive life stages which occurs as a result of exposure to relatively low concentrations of a toxic substance.

Classifications	Designation of the proposed uses of surface and ground waters with alphabetic character. Where classifications appear in two sections separated by a diagonal line, the first classification indicates existing use or general quality and the second classification indicates the water use goal.
Clean Water	Water, which in the judgement of the Commissioner, is of a quality substantially similar to that occurring naturally in the receiving stream under consideration; e.g., Clean water may include minor cooling waters, residential swimming pool water, and stormwater. Best Management Practices or other treatment may be required.
Coastal and Marine Waters	Those waters generally subject to the rise and fall of the tide and as defined by Section 22a-93 of the Connecticut General Statutes as amended.
Commissioner	Commissioner of Environmental Protection
Criteria	Elements of Connecticut's Water Quality Standards, expressed in parameters and their constituent concentrations, levels, or by narrative statements, representing a quality of water that supports a particular designated use.
Department	The Connecticut Department of Environmental Protection.
Depuration	Controlled shellfish purification process where a controlled environment is used to reduce the level of bacteria and viruses in shellfish. The process usually includes a fixed structure having a specified water circulation and disinfection system, together with designed tanks and racks.
Designated Use	Those uses specified in Connecticut's Water Quality Standards for each surface watercourse or ground water area, whether or not they are being attained.
Discharge	Defined in Sec. 22a-423 as " . . . the emission of any water, substance or material into the waters of the state, whether or not such substance causes pollution."
Discharge Toxicity Evaluation	A structured scientific analysis of the toxic strength and discharge rate of a treated wastewater effluent relative to available dilution in the receiving water. Prepared as described in the Department's guidance document, <u>Guidelines for Preparation of Discharge Toxicity Evaluations</u> . An analysis typically contains data and supporting information on receiving waterbody characteristics and recommendations regarding possible approaches to reduce effluent toxicity and in-stream toxic impacts resulting from the discharge.
Domestic Sewage	Waste water which consists of water and human excretions or other waterborne wastes incidental to the occupancy of a residential building or a non-residential building but not including manufacturing process water, cooling water, wastewater from water softening equipment, commercial laundry wastewater, blowdown from heating or cooling equipment, water from cellar or floor drains or surface water from roofs, paved surfaces, or yard drains.
Dredging	The excavation, removal or dispersal of sediments.
Effluent	Treated waste process waters or cooling waters discharged from a waste treatment or manufacturing facility.
Eutrophication	The process of enrichment of surface waters with plant nutrients which may cause nuisance algae blooms and excessive growth of aquatic weeds.

Existing Uses	Those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the Water Quality Standards.
Functional Feeding Group	General category of benthic macroinvertebrates based on feeding mechanisms.
Geometric Mean	Also referred to as the log mean, it is a measure of central tendency calculated by taking the anti-log of the mean of the logarithms of the values to be averaged.
Ground Waters	Waters flowing through earth materials, beneath the ground surface.
Ground Water of Natural Quality	Means ground water which is free from pollution by solid waste, wastewater discharges, chemical spills and leaks, pesticides or other anthropogenic sources of water pollution except for acid rain.
High Quality Waters	Waters of a quality which exceed established standards for the respective Class. May sustain a sensitive use which is designated for a higher Class. Refer to Standard number 2.
Indigenous	Animal or plant life which are naturally occurring inhabitants of a certain geographic region.
Invertebrates	Animals lacking a backbone.
Lentic	Standing water environments, such as lakes and ponds.
Lotic	Refers to flowing water habitats, as in streams or rivers.
Most Sensitive Use	The water use (drinking, swimming, boating, fish and aquatic life propagation, irrigation etc.) which is most susceptible to degradation by a specific pollutant. (e.g. Bacterial contamination can preclude swimming but not fish production; copper concentrations as low as 20 parts per billion (ppb) may adversely affect sensitive species of fish and aquatic life while drinking water quality is not affected until copper concentrations approach the secondary drinking water Maximum Concentration Level (MCL) of 1,000 parts per billion).
Moving Average	Mean of consecutive values in a time series of a specified duration. For example, a 12 month moving average is calculated by averaging the monthly values for a parameter for the most recent 12 consecutive months. It is called a moving average since as time progresses and more new values are available, old values are dropped resulting in an average which is always based on 12 consecutive monthly values.
MSD	Marine Sanitation Device. Devices installed or used on watercraft for the collection, treatment and disposal of human wastes.
Natural Origin	The natural ambient background level that has been measured.
Non-point Source	Wastewaters, leachate or runoff which originate from diffuse sources or widespread areas. For example; soil erosion from construction sites.
Point Sources	Treated or untreated wastewater discharges from manufacturing or sewage treatment works which are conveyed to their discharge point within discrete, readily identifiable pipes or conduits or are emitted through some other similar single point. For example, an outfall pipe from a sewage treatment plant.
Prudent	Means reasonable, after taking into consideration cost, in light of the social and environmental benefits.

Recreational Use	Water use which involves active or passive leisure activities such as fishing, swimming, boating, and aesthetic appreciation.
Sediments	Any natural or artificial materials which constitute all or part of the banks, bed or bottom of an intermittent or perennial watercourse.
Sewage	Defined in Sec. 22a-423 as, "human and animal excretions and all domestic and such manufacturing wastes as may tend to be detrimental to the public health."
Streamflow Regulation	Control of the rate of stream discharge by means of dams withdrawals, or diversion of water which might otherwise impede the flow of water in a watercourse.
Taxon (pl. Taxa)	Refers to a biological classification category, usually the finest division attainable in current taxonomy. Most benthic organisms are identified to genus or species.
Technically Practicable	Means, with respect to remediation, the greatest degree of remediation that can be achieved using sound engineering and hydro geologic practices.
Based Treatment	301(b) and 304(b) of the Federal Water Pollution Control (Clean Water) Act. The level and type of treatment required is based on the manufacturing process used and type of waste generated.
Tidal Wetlands and Creeks	Defined in Section 22a-29 of the Connecticut General Statutes as those areas which border on or lie beneath tidal waters.
Toxic Substance	Any substance which can adversely affect the survival, growth or reproduction of fish, other forms of aquatic life or humans exposed to the substance either by direct contact or through consumption of aquatic organisms.
Transplantation	Harvesting shellfish from designated closed areas, transporting and placing the shellfish onto other designated areas for propagation, growth, purification or transfer to an approved depuration plant.
Trophic Conditions	The state of enrichment of a waterbody with plant nutrients.
Use Attainability Analysis	A structured scientific assessment of the factors affecting the attainment of a watercourse designated use which may include physical, chemical, biological and economic factors. The analysis process is defined in: the Revised Water Quality Standards Regulations published in the Federal Register (48 FR 5 1400, November 8, 1983). Additional guidance regarding preparation of Use Attainability Analyses is contained in Chapter 3 of the Water Quality Standards Handbook (EPA - 1983) and Technical Support Manual: Water Body Surveys and Assessments for Conducting Use Attainability Analyses (EPA Office of Water, November 1983).
Waters of the State	Defined in Sec. 22a-423 as, " . . . all tidal waters, harbors, estuaries, rivers, brooks, watercourses, waterways, wells, springs, lakes, ponds, marshes, drainage systems, and all other surface or underground streams, bodies or accumulations of water, natural or artificial, public or private, which are contained within, flow through or border upon this state or any portion thereof."
Water Quality	A statement of the physical, chemical and biological characteristics of surface or ground waters.

Water Quality Based Treatment	Additional waste treatment defined under the provisions of Section 302 of the Clean Water Act when technology based treatment is not sufficient to protect water quality.
Water Quality Limited Segment	Any segment of a watercourse where it is known that water quality does not meet applicable standards and/or is not expected to meet applicable water quality standards even after the application of technology based effluent limitations.
Water Quality Standards	Provisions of state and federal law which consist of designated use or uses for the state's waters and water quality criteria which will support those uses.
Zone of Influence	Spatial area or volume of receiving water flow within which some degradation of water quality or use impairment is anticipated to occur as a result of a pollutant discharge. May be used to describe an area impacted by thermal, conventional, or toxic pollutants.
Zone of Passage	Spatial area or volume of flow within which the concentration of toxic chemicals and/or temperature elevations are below levels which would impede or prohibit the passage of free swimming and drifting aquatic organisms.
7Q10	(Seven-day, Ten-year low flow) - lowest 7 consecutive day mean stream discharge with a recurrence interval of ten (10) years.

APPENDIX D

NUMERICAL CRITERIA FOR TOXIC POLLUTANTS

APPENDIX D
NUMERICAL WATER QUALITY CRITERIA FOR CHEMICAL CONSTITUENTS ⁽¹⁾

Concentrations in ug/L

Compound	<u>Aquatic Life Criteria</u>				<u>Human Health Criteria</u>		
	Freshwater		Saltwater		Consumption of:		
	Acute ⁽²⁾	Chronic ⁽³⁾	Acute ⁽²⁾	Chronic ⁽³⁾	Organisms Only	Water and Organisms	Health Designation ⁽⁴⁾
Toxic Metals ⁽⁵⁾, Cyanides							
Antimony	---	---	---	---	4300	14	TT
Arsenic (Tri)	360	190	69	36	.14	.018	A
Beryllium	---	---	---	---	.13	.0077	TT
Cadmium	1.80	.62	42	9.3	170	16	TT
Chromium (hex)	15	10	1100	50	3,400	170	TT
Chromium (tri)	310	103	---	---	670,000	33,000	TT
Copper	14.3 ⁽⁶⁾	4.8 ⁽⁷⁾	2.4	2.4	---	1300	TT
Copper (site-specific) ⁽⁸⁾	25.7	18.1	---	---	---	1300	TT
Cyanide (HCN + CN ⁻)	22	5.20	1	1	220,000	700	TT
Lead	30	1.2	210	8.1	---	50	TT
Mercury	2.1	.012 (total)	1.8	.025 (total)	.15	.14	TT-HB
Nickel	788	88	74	8.2	4,600	610	TT
Selenium	20 (total)	5 (total)	290	71	6,800	100	TT
Silver	1.02	---	1.96	---	65,000	105	TT
Thallium	---	---	---	---	6.3	1.7	TT
Zinc	63.6	58.2	90	81	---	---	TT

Compound	Aquatic Life Criteria				Human Health Criteria		
	Freshwater		Saltwater		Consumption of:		
	Acute	Chronic	Acute	Chronic	Organisms Only	Water and Organisms	Health Designation
Volatiles							
Acrolein	---	---	---	---	780	320	TT
Acrylonitrile	---	---	---	---	.66	.059	C
Benzene	---	---	---	---	71	1.2	A
Bromoform	---	---	---	---	360	4.3	C
Carbon Tetrachloride	---	---	---	---	4.4	.25	C
Chlorobenzene	---	---	---	---	21,000	680	TT
Chlorodibromomethane	---	---	---	---	34	.41	C
Chloroethane	---	---	---	---	---	---	---
Chloroform	---	---	---	---	470	5.7	C
Dichlorobromomethane	---	---	---	---	22	.27	C
1,1 Dichloroethane	---	---	---	---	---	---	---
1-2-Dichloroethane	---	---	---	---	99	.38	C
1,1-Dichloroethylene	---	---	---	---	3.2	0.057	C
1,2,T-Dichloroethylene	---	---	---	---	---	700	TT
1,2-Dichloropropane	---	---	---	---	39	0.52	TT
1,3-Dichloropropylene	---	---	---	---	1,700	10	TT
Ethylbenzene	---	---	---	---	29,000	3,100	TT
Methyl Bromide	---	---	---	---	4,000	48	TT
Methyl Chloride	---	---	---	---	470	5.7	TT
Methylene Chloride	---	---	---	---	1,600	4.7	C
1,1,2,2-Tetrachloroethane	---	---	---	---	11	.17	C-HB
Tetrachloroethylene	---	---	---	---	8.85	.8	TT
Toluene	---	---	---	---	200,000	6,800	TT

Aquatic Life Criteria				Human Health Criteria			
Freshwater		Saltwater		Consumption of:			
Compound	Acute	Chronic	Acute	Chronic	Organisms Only	Water and Organisms	Health Designation
Volatiles (continued)							
Trichloroethylene	---	---	---	---	81	2.7	C
Vinyl Chloride	---	---	---	---	525	2	C
GC/MS : Acid Compounds							
2-Chlorophenol	---	---	---	---	2300	540	TT
2,4-Dichlorophenol	---	---	---	---	790	93	TT
2,4-Dimethylphenol	---	---	---	---	---	---	---
3-Methyl-4-chlorophenol	---	---	---	---	---	---	---
2-Methyl-4,6-Dinitrophenol (=4,6 Dinitro-o-cresol)	---	---	---	---	765	13.4	TT
2,4-Dinitrophenol	---	---	---	---	14,000	70	TT
2-Nitrophenol	---	---	---	---	---	---	---
Pentachlorophenol	9.07	5.73	13	7.9	8.2	.28	C-HB
Phenol	---	---	---	---	4,600,000	21,000	TT
2,4,6-Trichlorophenol	---	---	---	---	6.5	2.1	C-HB
Base Neutral Compounds							
Acenaphthene	---	---	---	---	2700	1200	TT-HB
Acenaphthylene	---	---	---	---	.031	.0028	C-HB
Anthracene	---	---	---	---	110,000	9,600	C-HB
Benzidine	---	---	---	---	.00054	.00012	A
Benzo(a)anthracene	---	---	---	---	.031	.0028	C-HB
Benzo(a)pyrene	---	---	---	---	.031	.0028	C-HB
Benzo(b)fluoranthene	---	---	---	---	.031	.0028	C-HB
Benzo(ghi)perylene	---	---	---	---	.031	.0028	C-HB

Aquatic Life Criteria				Human Health Criteria			
Freshwater		Saltwater		Consumption of:			
Compound	Acute	Chronic	Acute	Chronic	Organisms Only	Water and Organisms	Health Designation
Base Neutral Compounds (continued)							
Benzo(k)fluoranthene	---	---	---	---	.031	.0028	C-HB
Bis(2-chloroethoxy)Methane	---	---	---	---	---	---	---
Bis(2-Chloroethyl)Ether	---	---	---	---	1.4	.031	C
Bis(2-Chloroisopropyl)Ether	---	---	---	---	170,000	1,400	TT
Bis(2-Ethylhexyl)phthalate	---	---	---	---	5.9	1.8	C-HB
4-Bromophenyl ether	---	---	---	---	---	---	---
Butyl benzl phthalate	---	---	---	---	5200	3000	TT-HB
2-Chloronapthalene	---	---	---	---	4300	1700	TT-HB
2-chlorophenyl phenyl ether	---	---	---	---	---	---	---
Chrysene	---	---	---	---	.031	.0028	C-HB
Dibenzo(a,h)anthracene	---	---	---	---	.031	.0028	C-HB
1,2-Dichlorobenzene	---	---	---	---	17,000	2,700	TT-HB
1,3-Dichlorobenzene	---	---	---	---	2,600	400	TT-HB
1,4-Dichlorobenzene	---	---	---	---	2,600	400	TT-HB
3,3-Dichlorobenzidines	---	---	---	---	.077	.04	C-HB
Diethyl Phthalate	---	---	---	---	120,000	23,000	TT
Dimethyl Phthalate	---	---	---	---	2,900,000	313,000	TT
Di-n-butyl Phthalate	---	---	---	---	12,000	2,700	TT-HB
Di-n-octyp phthalate ester	---	---	---	---	---	---	---
2,4-Dinitrotoluene	---	---	---	---	9.1	.11	C
2,6-Dinitrotoluene	---	---	---	---	---	---	---
Di-n-octyl phthalate	---	---	---	---	---	---	---

Aquatic Life Criteria				Human Health Criteria			
Freshwater		Saltwater		Consumption of:			
Compound	Acute	Chronic	Acute	Chronic	Organisms Only	Water and Organisms	Health Designation
Base Neutral Compounds (continued)							
1,2-Diphenylhydrazine	---	---	---	---	.54	.04	C
Fluoranthene	---	---	---	---	370	300	TT-HB
Fluorene	---	---	---	---	14,000	1,300	C-HB
Hexachlorobenzene	---	---	---	---	.00077	.00075	C-HB
Hexachlorobutadiene	---	---	---	---	50	.44	C-HB
Hexachlorocyclopentadiene	---	---	---	---	17,000	240	TT-HB
Hexachloroethane	---	---	---	---	8.9	1.9	C-HB
Indeno(1,2,3-cd)pyrene	---	---	---	---	.031	.0028	C-HB
Isophorone	117,000	---	---	---	600	8.4	TT
Naphthalene	---	---	---	---	---	---	---
Nitrobenzene	---	---	---	---	1,900	17	TT
N-Nitrosodimethylamine	---	---	---	---	8.1	.00069	C
N-Nitrosodi-n-propylamine	---	---	---	---	1.4	0.005	C
N-Nitrosodiphenylamine	---	---	---	---	16	5	C
Phenanthrene	---	---	---	---	.031	.0028	C-HB
Pyrene	---	---	---	---	11,000	960	C-HB
1,2,4-Trichlorobenzene	---	---	---	---	---	---	---
Pesticides:							
Aldrin	1.50	---	.65	---	.00014	.00013	C-HB
Chlordane	1.20	.0043	.045	.004	.00059	.00057	C-HB
DDT	.55	.001	.065	.001	.00059	.00059	C-HB
DDD	---	---	---	---	.00084	.00083	C-HB
DDD	---	---	---	---	.00059	.00059	C-HB

Compound	<u>Aquatic Life Criteria</u>				<u>Human Health Criteria</u>		
	Freshwater		Saltwater		Consumption of:		
	Acute	Chronic	Acute	Chronic	Organisms Only	Water and Organisms	Health Designation
Pesticides (continued)							
Dieldrin	1.25	.0019	.355	.0019	.00014	.00014	C
Endosulfan(alpha)	.11	.056	.017	.0087	2.0	.93	TT
Endosulfan (beta)	.11	.056	.017	.0087	2.0	.93	TT
Endosulfan Sulfate	---	---	---	---	2.0	.93	TT
Endrin	.09	.0023	.0185	.0023	.81	.76	TT
Endrin Aldehyde	---	---	---	---	.81	.76	TT
Heptachlor	.26	.0038	.0265	.0036	.00021	.00021	C
Heptachlor epoxide	.26	.0038	.0265	.0036	.00011	.00010	C
Hexachlorocyclohexane (Alpha)	---	---	---	---	.013	.0039	C-HB
Hexachlorocyclohexane (Beta)	---	---	---	---	.046	.014	C-HB
Hexachlorocyclohexane (delta)	---	---	---	---	---	---	---
Hexachlorocyclohexane (Gamma) 'Lindane'	1.0	.08	.08	---	.063	.019	TT-HB
Polychlorinated Biphenyls	---	.014	---	.03	.00017	.00017	C-HB
2,3,7,8-TCDD	---	---	---	---	.000000014	.000000013	C-HB
Toxaphene	.73	.0002	.21	.0002	.00075	.00073	C-HB
Other Substances:							
Ammonia	See Table ⁽⁹⁾	See Table ⁽⁹⁾	See Table ⁽⁹⁾	See Table ⁽⁹⁾	---	---	---
Asbestos	---	---	---	---	---	7,000,000 fibers/liter	A
Chlorine	19	11	13	7.5	---	---	---

TABLE NOTES:

1. The minimum data necessary to determine consistency with Connecticut Water Quality Standards shall be subject to the Commissioner's discretion and may not be limited to or include chemical analysis results for all of the constituents listed in Appendix D.
2. Biological integrity is impaired by an exposure of one hour or longer to a concentration which exceeds the acute criteria more frequently than once every three years on average.
3. Biological integrity is impaired when the four-day average concentration exceeds the chronic criteria more frequently than once every three years on average.
4. The Commissioner will consider the following human health designations in allocating zones of influence for point source discharges:

A: Class A carcinogen (known human carcinogen)
 TT: Threshold Toxicant, not carcinogenic
 C: Carcinogenic (probable or possible carcinogen)
 HB: High potential to bioaccumulate or bioconcentrate.

5. Criteria apply to the dissolved fraction unless otherwise noted.
6. Biological integrity is impaired when the ambient concentration exceeds this value on more than 5% of days in any year.
7. Biological integrity is impaired when the ambient concentration exceeds this value on more than 50% of days in any year.
8. Site specific criteria for copper apply for the following waters:

Bantam River	Litchfield POTW to confluence with Shepaug River
Blackberry River	Norfolk POTW to confluence with Roaring Brook
	North Canaan POTW to confluence with Housatonic River
Factory Brook	Salisbury POTW to mouth
Five Mile River	New Canaan POTW to mouth
Hockanum River	Vernon POTW to confluence with Connecticut River
Mill Brook	Plainfield Village POTW to mouth
Naugatuck River	Torrington POTW to confluence with Housatonic River
Norwalk River	Ridgefield Brook to Branchville
Pequabuck River	Plymouth POTW to confluence with Farmington River
Quinnipiac River	Southington POTW to Broadway, North Haven
Still River	Winsted POTW to confluence with Farmington River
Still River	Limekiln Brook to confluence with Housatonic River
Williams Brook	Ledyard POTW to mouth
Willimantic River	Stafford Springs POTW to Trout Management Area (Willington)
	Eagleville Dam to confluence with Shetucket River

9. Criteria for ammonia may be adjusted to account for seasonal variation in temperature as indicated below. Criteria values are expressed in N.

Acute Toxicity

	Temperature °C						
	0	5	10	15	20	25	30
Freshwater (general)	23.1	21.4	20.6	19.8	18.9	13.2	9.9
Freshwater (Salmon spawning)	23.1	21.4	20.6	19.8	18.9	13.2	9.9
Estuarine (20 mg/Kg salinity)	29.0	20.0	14.0	9.8	6.7	4.8	3.3
Marine (30 mg/Kg salinity)	31.0	21.0	15.0	10.0	7.3	5.0	3.5

Chronic Toxicity

	Temperature °C						
	0	5	10	15	20	25	30
Freshwater (general)	2.47	2.30	2.22	2.14	2.06	1.43	1.01
Freshwater (Salmon spawning)	2.47	2.30	2.22	2.14	1.45	1.01	0.72
Estuarine (20 mg/Kg salinity)	4.40	3.00	2.10	1.50	1.00	0.72	0.31
Marine (30 mg/Kg salinity)	4.70	3.10	2.20	1.60	1.10	0.75	0.53